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The Europa Orbiter Mission Design

Jan M. Ludwinski, Alok K. Chatterjee, Mark D. Guman, Jennie R. Johannesen, Robert W. Maddock, Robert T. Mitchell, and Robert L. Staehle
All above at Jet Propulsion Laboratory, Pasadena , Ca.

Abstract

The Europa Orbiter mission is to be the first in NASA's Outer Planets/Solar Probe Program. Following on the heels of the successful Galileo mission, which provided dramatic evidence that a water ocean existed on Europa at least in the recent past, the primary goal of Europa Orbiter is to ascertain whether or not a subsurface ocean of water exists today.

The reference mission profile emerged from a series of studies of various mission options, including launch vehicles from Delta II class to the Space Shuttle, and trajectory types from direct to multi-planet gravity assists including solar electric propulsion. A summary of the major mission options is included, and the 2003 direct mission is described in detail. A discussion of the key mission design challenges, including managing radiation dose and delta-V, motivates the mission profile, which culminates in a one month mission around Europa. The use of automated navigation techniques during the final approach to Europa is expected to reduce operations cost and to reduce the delta-V required to enter European orbit. A brief description of the programmatic considerations, science objectives and current status of the flight system is included for background.

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